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EXAMINER

LAUCHMAN, LAYLA G

ART UNIT PAPER NUMBER

2877

DATE MAILED: 11/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

10/034,790

Examiner

L. G. Lauchman

Applicant(s)

WRIGHT ET AL.

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-61 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-61 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other:

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 7-12, 14, 20-23, 25, 31-34, 36, 42-50, 54-61 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6, 18-21, 31-34, 44-50, 54, 55, 62, 63, 64 of U.S. Patent No. 6,458,605. Although the conflicting claims are not identical, they are not patentably distinct from each other because Claims 1, 7-12, 14, 20-23, 25, 31-34, 36, 42-50, 54-61 are generic to the method recited in Claims 1-6, 18-21, 31-34, 44-50, 54, 55, 62, 63, 64 of Patent '605. That is, Claims 1-6, 18-21, 31-34, 44-50, 54, 55, 62, 63, 64 of Patent '605 fall entirely within the scope of Claims 1, 7-12, 14, 20-23, 25, 31-34, 36, 42-50, 54-61.

As to Claim 1, Claim 1 of Patent '605 meets Claim 1 of the application, such as it teaches a method, comprising:

providing a wafer having a first grating structure and a second grating structure formed in a photoresist layer;

illuminating at least a portion of the first and second grating structures with a light source;

measuring light reflected from the illuminated portion of the first and second grating structures to generate a reflection profile;

and determining misregistration between the first and second grating structures based on the reflection profile.

The patented claim 1 determines "overlay error between the first and second grating structure." However, the term "misregistration" has the same meaning as "overlay error," and in the art of photolithography is defined as the relative misalignment of the features produced by two different mask levels.

As to Claim 7, Claim 1 of Patent '605 falls entirely within the scope of Claim 7. The term "misregistration" has the same meaning as "overlay error," and in the art of photolithography is defined as the relative misalignment of the features produced by two different mask levels.

As to Claim 8, Claim 3 of Patent '605 falls entirely within the scope of Claim 8 of the application.

As to Claim 9, Claim 2 of Patent '605 falls entirely within the scope of Claim 9 of the application.

As to Claim 10, Claim 5 of Patent '605 falls entirely within the scope of Claim 10 of the application.

As to Claim 11, Claim 4 of Patent '605 falls entirely within the scope of Claim 11 of the application.

As to Claim 12, Claim 6 of Patent '605 falls entirely within the scope of Claim 12 of the application.

As to Claim 14, Claim 18 of Patent '605 meets Claim 14 of the application, such as it teaches a method, comprising:

providing a wafer having a first grating structure and a second grating structure formed in a photoresist layer;

illuminating at least a portion of the first and second grating structures with a light source;

measuring light reflected from the illuminated portion of the first and second grating structures to generate a reflection profile;

comparing the generated reflection profile to a library of reference reflection profiles, each reference reflection profile having an associated misregistration metric;

selecting a reference reflection profile closest to the generated reflection profile;

and determining misregistration between the first and second grating structures based on the misregistration metric associated with the selected reference reflection profile.

The patented claim 18 determines "overlay error between the first and second grating structure based on the overlay metric." However, the term "misregistration" has the same meaning as "overlay error," and in the art of photolithography is defined as the relative misalignment of the features produced by two different mask levels.

As to Claim 20, Claim 18 of Patent '605 falls entirely within the scope of Claim 20 of the application.

As to Claim 21, Claim 19 of Patent '605 falls entirely within the scope of Claim 21 of the application.

As to Claim 22, Claim 20 of Patent '605 falls entirely within the scope of Claim 22 of the application.

As to Claim 23, Claim 21 of Patent '605 falls entirely within the scope of Claim 23 of the application.

As to Claim 25, Claim 31 of Patent '605 meets Claim 25 of the application, such as it teaches a method, comprising:

providing a wafer having a first grating structure and a second grating structure formed in a photoresist layer;

illuminating at least a portion of the first and second grating structures with a light source;

measuring light reflected from the illuminated portion of the first and second grating structures to generate a reflection profile;

comparing the generated reflection profile to target reflection profile;

and determining misregistration between the first and second grating structures based on the comparison of the generated reflection profile and the target reflection profile.

The patented claim 31 determines "overlay error between the first and second grating structure." However, the term "misregistration" has the same meaning as "overlay error," and in the art of photolithography is defined as the relative misalignment of the features produced by two different mask levels.

As to Claim 31, Claim 31 of Patent '605 falls entirely within the scope of Claim 31 of the application.

As to Claim 32, Claim 32 of Patent '605 falls entirely within the scope of Claim 32 of the application.

As to Claim 33, Claim 33 of Patent '605 falls entirely within the scope of Claim 33 of the application.

As to Claim 34, Claim 34 of Patent '605 falls entirely within the scope of Claim 34 of the application.

As to Claim 36, Claim 44 of Patent '605 meets Claim 36 of the application, such as it teaches a processing line, comprising:

- a photolithography stepper adapted to process wafers in accordance with an operating recipe;

- a metrology tool adapted to receive a wafer process the stepper and having a first and second grating structures, the metrology tool comprising:

- a light source adapted to illuminate at least a portion of the first and second grating structures;

- a detector adapted to measure light reflected from the illuminated portion of the first and second grating structures to generate a reflection profile;

- a data processing unit adapted to determine misregistration between the first and second grating structures based on the comparison of the reflection profile; and

- a controller adapted to at least one parameter of the operating recipe of the photolithography stepper based on the determined misregistration.

The patented claim 44 determines "overlay error between the first and second grating structure." However, the term "misregistration" has the same meaning as "overlay error," and in the art of photolithography is defined as the relative misalignment of the features produced by two different mask levels.

As to Claim 42, Claim 47 of Patent '605 falls entirely within the scope of Claim 42 of the application.

As to Claim 43, Claim 45 of Patent '605 falls entirely within the scope of Claim 43 of the application.

As to Claim 44, Claim 46 of Patent '605 falls entirely within the scope of Claim 44 of the application.

As to Claim 45, Claim 48 of Patent '605 falls entirely within the scope of Claim 45 of the application.

As to Claim 46, Claim 49 of Patent '605 falls entirely within the scope of Claim 46 of the application.

As to Claim 47, Claim 50 of Patent '605 falls entirely within the scope of Claim 47 of the application.

As to Claim 48, Claim 54 of Patent '605 falls entirely within the scope of Claim 48 of the application.

As to Claim 49, Claim 55 of Patent '605 falls entirely within the scope of Claim 49 of the application.

As to Claim 50, Claim 44 of Patent '605 meets Claim 50 of the application, such as it teaches a processing line, comprising:

a metrology tool adapted to receive a wafer process the stepper and having a first and second grating structures, the metrology tool comprising:

a light source adapted to illuminate at least a portion of the first and second grating structures;

a detector adapted to measure light reflected from the illuminated portion of the first and second grating structures to generate a reflection profile;

a data processing unit adapted to determine misregistration between the first and second grating structures based on the comparison of the reflection profile.

The patented claim 44 determines "overlay error between the first and second grating structure." However, the term "misregistration" has the same meaning as "overlay error," and in the art of photolithography is defined as the relative misalignment of the features produced by two different mask levels.

As to Claim 54, Claim 45 of Patent '605 falls entirely within the scope of Claim 54 of the application.

As to Claim 55, Claim 46 of Patent '605 falls entirely within the scope of Claim 55 of the application.

As to Claim 56, Claim 48 of Patent '605 falls entirely within the scope of Claim 56 of the application.

As to Claim 57, Claim 54 of Patent '605 falls entirely within the scope of Claim 57 of the application.

As to Claim 58, Claim 55 of Patent '605 falls entirely within the scope of Claim 58 of the application.

As to Claim 59, Claim 62 of Patent '605 meets Claim 59 of the application, such as it teaches a processing line, comprising:

means for receiving a wafer and having a first and second grating structures formed in a photoresist layer;

means for illuminating at least a portion of the first and second grating structures with a light source;

means for measuring light reflected from the illuminated portion of the first and second grating structures to generate a reflection profile;

means for determining misregistration between the first and second grating structures based on the comparison of the reflection profile.

The patented claim 62 determines "overlay error between the first and second grating structure." However, the term "misregistration" has the same meaning as "overlay error," and in the art of photolithography is defined as the relative misalignment of the features produced by two different mask levels.

As to Claim 60, Claim 63 of Patent '605 falls entirely within the scope of Claim 60 of the application.

As to Claim 61, Claim 64 of Patent '605 falls entirely within the scope of Claim 61 of the application.

Claims 2-6, 13, 15-19, 24, 26-30, 35, 37-41, 51-53 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 18, 31, 44, 62 of U.S. Patent No. 6,458,605 in view of Niu et al (6,433,878).

As to Claim 2, Claim 1 of Patent '605 recites everything as applied to Claim 1 of the application.

Claim 1 lacks patterning the first grating structure using a first photomask, and patterning the second grating structure using the second photomask.

Niu et al teach a method comprised of printing a plurality of gratings utilizing various masks associated with known photolithographic settings. It would have been obvious to modify Claim 1 of Patent '605 as taught by Niu to have the first and second grating structures being printed by the first and second photomasks, since the first and second photomasks would provide the reduction of misalignment errors.

As to Claim 3, Claim 1 of Patent '605 and Patent '878 teach everything as applied to Claim 2 of the application, in addition Patent '878 describes using phase-shifting masks and binary masks to print the gratings (see col. 9, lines 20-25).

As to Claim 4, Claim 1 of Patent '605 and Patent '878 teach everything as applied to Claim 2 of the application, in addition Patent '878 describes the first and second grating structures comprising first and second plurality of lines (see Fig. 16).

As to Claims 5 and 6, Claim 1 of Patent '605 and Patent '878 teach everything as applied to Claim 2 of the application, in addition Patent '878 describes the second plurality of lines further comprising the second plurality of lines adjacent the second

plurality of lines, and forming the second plurality of lines interleaved with respect to the second plurality of lines (see Fig. 16 and 18).

As to Claim 13, Claim 1 of Patent '605 and Patent '878 teach everything as applied to Claim 2 of the application, in addition Patent '878 describes developing the photoresist layer to define the first and second grating structures prior to illumination the first and second grating structures.

As to Claim 15, Claim 18 of Patent '605 recites everything as applied to Claim 15 of the application.

Claim 18 lacks patterning the first grating structure using a first photomask, and patterning the second grating structure using the second photomask.

Niu et al teach a method comprised of printing a plurality of gratings utilizing various masks associated with known photolithographic settings. It would have been obvious to modify Claim 18 of Patent '605 as taught by Niu to have the first and second grating structures being printed by the first and second photomasks, since the first and second photomasks would provide the reduction of misalignment errors.

As to Claim 16, Claim 18 of Patent '605 and Patent '878 teach everything as applied to Claim 15 of the application, in addition Patent '878 describes using phase-shifting masks and binary masks to print the gratings (see col. 9, lines 20-25).

As to Claim 17, Claim 18 of Patent '605 and Patent '878 teach everything as applied to Claim 15 of the application, in addition Patent '878 describes the first and second grating structures comprising first and second plurality of lines (see Fig. 16).

As to Claims 18 and 19, Claim 18 of Patent '605 and Patent '878 teach everything as applied to Claim 15 of the application, in addition Patent '878 describes the second plurality of lines further comprising the second plurality of lines adjacent the second plurality of lines, and forming the second plurality of lines interleaved with respect to the second plurality of lines (see Fig. 16 and 18).

As to Claim 24, Claim 1 of Patent '605 and Patent '878 teach everything as applied to Claim 15 of the application, in addition Patent '878 describes developing the photoresist layer to define the first and second grating structures prior to illumination the first and second grating structures.

As to Claim 26, Claim 31 of Patent '605 recites everything as applied to Claim 26 of the application.

Claim 31 lacks patterning the first grating structure using a first photomask, and patterning the second grating structure using the second photomask.

Niu et al teach a method comprised of printing a plurality of gratings utilizing various masks associated with known photolithographic settings. It would have been obvious to modify Claim 31 of Patent '605 as taught by Niu to have the first and second grating structures being printed by the first and second photomasks, since the first and second photomasks would provide the reduction of misalignment errors.

As to Claim 27, Claim 31 of Patent '605 and Patent '878 teach everything as applied to Claim 26 of the application, in addition Patent '878 describes using phase-shifting masks and binary masks to print the gratings (see col. 9, lines 20-25).

As to Claim 28, Claim 31 of Patent '605 and Patent '878 teach everything as applied to Claim 26 of the application, in addition Patent '878 describes the first and second grating structures comprising first and second plurality of lines (see Fig. 16).

As to Claims 29 and 30, Claim 31 of Patent '605 and Patent '878 teach everything as applied to Claim 26 of the application, in addition Patent '878 describes the second plurality of lines further comprising the second plurality of lines adjacent the second plurality of lines, and forming the second plurality of lines interleaved with respect to the second plurality of lines (see Fig. 16 and 18).

As to Claim 35, Claim 1 of Patent '605 and Patent '878 teach everything as applied to Claim 26 of the application, in addition Patent '878 describes developing the photoresist layer to define the first and second grating structures prior to illumination the first and second grating structures.

As to Claim 37, Claim 44 of Patent '605 recites everything as applied to Claim 37 of the application.

Claim 44 lacks patterning the first grating structure using a first photomask, and patterning the second grating structure using the second photomask.

Niu et al teach a method comprised of printing a plurality of gratings utilizing various masks associated with known photolithographic settings. It would have been obvious to modify Claim 44 of Patent '605 as taught by Niu to have the first and second grating structures being printed by the first and second photomasks, since the first and second photomasks would provide the reduction of misalignment errors.

As to Claim 38, Claim 44 of Patent '605 and Patent '878 teach everything as applied to Claim 37 of the application, in addition Patent '878 describes using phase-shifting masks and binary masks to print the gratings (see col. 9, lines 20-25).

As to Claim 39, Claim 44 of Patent '605 and Patent '878 teach everything as applied to Claim 37 of the application, in addition Patent '878 describes the first and second grating structures comprising first and second plurality of lines (see Fig. 16).

As to Claims 40 and 11, Claim 44 of Patent '605 and Patent '878 teach everything as applied to Claim 37 of the application, in addition Patent '878 describes the second plurality of lines further comprising the second plurality of lines adjacent the second plurality of lines, and forming the second plurality of lines interleaved with respect to the second plurality of lines (see Fig. 16 and 18).

As to Claim 51, Claim 44 of Patent '605 recites everything as applied to Claim 51 of the application.

Claim 44 lacks patterning the first grating structure using a first photomask, and patterning the second grating structure using the second photomask.

Niu et al teach a method comprised of printing a plurality of gratings utilizing various masks associated with known photolithographic settings. It would have been obvious to modify Claim 44 of Patent '605 as taught by Niu to have the first and second grating structures being printed by the first and second photomasks, since the first and second photomasks would provide the reduction of misalignment errors.

As to Claim 52, Claim 44 of Patent '605 and Patent '878 teach everything as applied to Claim 51 of the application, in addition Patent '878 describes using phase-shifting masks and binary masks to print the gratings (see col. 9, lines 20-25).

As to Claim 53, Claim 44 of Patent '605 and Patent '878 teach everything as applied to Claim 51 of the application, in addition Patent '878 describes the first and second grating structures comprising first and second plurality of lines (see Fig. 16).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 7-12, 14, 20-23, 25, 31-34, 36, 42-50, 54-61 are rejected under 35 U.S.C. 102(e) as being anticipated by Stirton US (6,458,605). See the double patenting rejection of the claims above.

The applied reference has a common Assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Conclusion

Papers related to this application may be submitted to Technology Center 2800 by facsimile transmission. Papers should be faxed to TC 2877 via the PTO Fax Center located in CP4-4C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Center number is (703) 872-9306.

If the Applicant wishes to send a Fax dealing with either a Proposed Amendment or for discussion for a phone interview then the fax should:

a) Contain either the statement "DRAFT" or "PROPOSED AMENDMENT" on the Fax Cover Sheet; and

b) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to L. G. Lauchman whose telephone number is (703) 305-0071.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC receptionist whose telephone number is (703) 308-0956.



L. G. Lauchman
Patent Examiner
Art Unit 2877
11/13/03/lgl